

Appl. No. : 09/844,959  
Filed : April 27, 2001

### REMARKS

Claims 11-14 are pending in this application.

#### **Claim Rejection - 35 U.S.C. § 103(a)**

Claims 1-14 have been rejected under 35 U.S.C. §103(a) as obvious over Cooney, III et al. (U.S. 6,066,577), in view of Chiang et al. (U.S. 6,309,956).

To articulate a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). Cooney, III et al. and Chiang et al. do not disclose every element of Applicants' claims, and therefore do not render obvious Applicants' claims.

The pending independent claim recites "[a]n integrated circuit comprising an interconnect structure, said interconnect structure comprising a dielectric layer, said dielectric layer comprising at least a portion of a hard mask layer, the hard mask layer comprising a patterned organic polymer film wherein a portion of the patterned organic polymer film is fluorinated." Cooney, III et al. discloses an integrated circuit structure including a fluorine rich insulating layer prepared by fluorine doping a conventional silicon dioxide or amorphous carbon layer. Cooney, III et al. does not disclose an integrated circuit comprising an organic polymer film, much less a patterned organic polymer film wherein a portion of the patterned organic polymer film is fluorinated. Chiang et al. discloses an interconnect structure including an organic polymer dielectric, as well as other dielectrics such as fluorinated silicon dioxide (see col. 5, lines 50-53). Chiang et al. does not disclose an integrated circuit comprising an organic polymer film wherein a portion of the patterned organic polymer film is fluorinated.

As discussed above, Cooney, III et al. and Chiang et al. do not disclose fluorinated organic polymer films. Moreover, there is no suggestion to combine or modify the references so as to produce the invention as presently claimed. To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See, e.g.*, M.P.E.P. § 2142.

Cooney, III et al. and Chiang et al. teach low-K insulating materials, namely, organic polymer films and fluorinated silicon dioxide. They do not, however, teach how to modify an organic polymer film such that it can function as a hard mask layer in an integrated circuit interconnect structure. Applicants have discovered that by adding fluorine to an organic polymer

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film, such as films employed as insulators in integrated circuit interconnect structures, the fluorinated portion of the film can function as a hard mask layer. Moreover, such fluorine containing hard mask layers offer advantages over conventional hard mask materials, such as  $\text{Si}_3\text{N}_4$ , in that they possess lower K values, and they are attractive for use in isolation structures wherein the hard mask cannot be removed, such as dual damascene structures.

Accordingly, Applicants respectfully request that the rejection be withdrawn.


**Conclusion**

In view of the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns that might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 10/19/04

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